

ORMEGIAN COASTA

Imaros Task 4.1

Mechanical Recovery

Bjørn R. Frost Norwegian Coastal Administration





National test centre of oil spill response equipment



LENGDESNITT



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Test 1 – pure oil in enclosed basin







Test 2 – oil emulsion in boom with current

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Pouring oil into the basin







Making the oil emulsion





	VLSFC) IM-14		
Pure oil		Oil emulsion		
Water content	0.2 %	Water content	48 %	
Viscosity (10 °C 10 s ⁻¹)	13256 cP	Viscosity (15 °C 10 s ⁻¹)	18713 cP	
Density (40 °C)	0.91 g/ml	Density (50 °C)	0.93 g/ml	
Pour point	27 (±3) °C			
	VLSFC) IM-15		
Pur	e oil	Oil em	ulsion	
Water	0,2 %	Water content	47 %	
Viscosity (10 °C 10 s ⁻¹)	9195 cP	Viscosity (15 °C 10 s ⁻¹)	41688 cP	
Density (40 °C)	0.93 g/ml	Density (50 °C)	0.97 g/ml	
Pour point	0 (±3) °C			
	ULSFC	D IM-16		
Pur	e oil	Oil em	ulsion	
Water content	2.6 %	Water content	-	
Viscosity (10 °C 10 s ⁻¹)	44211 cP	Viscosity	-	
Density (40 °C)	0.89 g/ml	Density	-	
Pour point	33 (±3) °C			
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Results

	VLSFO IM-14		VLSFO IM-15		ULSFO IM-16	
	Pure oil	Emulsion	Pure oil	Emulsion	Pure oil	Emulsion
Drum skimmer	poor	reduced	reduced	reduced	unsuitable	unsuitable
Belt skimmer	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable
Adhesion band skimmer	poor	reduced	reduced	good	unsuitable	unsuitable
Brush skimmer		poor				
Weir skimmer		unsuitable				

- Recovery above **50%** of the manufacturer's maximum capacity is rated as *good*

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- Recovery between **25-50%** of the manufacturer's maximum capacity is rated as *reduced* Recovery between **5-25%** of the manufacturer's maximum capacity is rated as *poor*
- Recovery below 5% of the manufacturer's maximum capacity is rated as unsuitable

Drum skimmer VLSFO IM-15

IM-15	Drum skimmer			
	Pure oil	Emulsion		
Result	Reduced	Reduced		
Recovery rate <i>m³/h</i>	14.5	23.5		
Efficiensy % of max capasity	29 %	47 %		
Viscosity cP (10 s-1)	5581	45812		
Water content vol %	2,2 %	48,2 %		





Belt skimmer VLSFO IM-15

IM-15	Belt skimmer				
	Pure oil	Emulsion			
Result	Unsuitable	Unsuitable			
Recovery rate <i>m³/h</i>	0.5	2.5			
Efficiency % of max capasity	0,6 %	3 %			
Viscosity cP (10 s-1)	5581	39024			
Water content vol%	2,2 %	41,6 %			
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Band skimmer VLSFO IM-15

IM-15	Band sk	mmer		
	Pure oil	Emulsion		
Result	Reduced	Good		
Recovery rate m ³ /h	3.7	5		
Efficiency % of max capacity	41 %	55 %		
Viscosity <i>cP (10 s</i> ⁻¹)	5581	41688		
Water content vol%	2,2 %	46,7 %		



Drum skimmer VLSFO IM-14

IM-14	Drum skimmer			
	Pure oil	Emulsion		
Result	Poor	Reduced		
Recovery rate m ³ /h	9,6	15,8		
Efficiensy % of max capasity	19 %	32 %		
Viscosity cP (10 s ⁻¹)	12 333	16 844		
Water content vol%	9,1 %	46,6 %		





Belt skimmer VLSFO IM-14

IM-14	Belt skimmer			
	Pure oil	Emulsion		
Result	Unsuitable	Unsuitable		
Recovery rate m ³ /h	1,7	1,3		
Efficiency % of max capasity	2,1 %	1,6 %		
Viscosity cP (10 s ⁻¹)	12 333	15 269		
Water content vol%	9,1 %	47,3 %		



Band skimmer VLSFO IM-14

IM-14	Band skimmer			
	Pure oil	Emulsion		
Result	Poor	Reduced		
Recovery rate m ³ /h	1,4	2,5		
Efficiency % of max capacity	16 %	28 %		
Viscosity cP (10 s ⁻¹)	12 333	17 445		
Water content vol%	9,1 %	46,3 %		
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Absorbent boom test







What did we learn?

- The oil "rolls" at the start of the oil slick. This meant a greater thickness at the outer edge of the oil slick and the least thickness further in by the boom.
- The chosen skimmers were produced before VLSFOs came on the market – they are intened for recovery of traditional heavy fuel oils
- Challenges with «short» oil properties (IM-14)
- Skimmer design floaters etc.









Results ULSFO IM-16

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IM-16	Drum skimmer		IM-16	Belt skimmer		IM-16	Band sk	kimmer
	Pure oil	Emulsion		Pure oil	Emulsion		Pure oil	Emulsion
Result	Unsuitable	-	Result	Unsuitable	-	Result	Unsuitable	-
Recovery rate m ³ /h	0	-	Recovery rate <i>m³/h</i>	0	-	Recovery rate m ³ /h	0	-
Efficiensy % of max capasity	0	-	Efficiency % of max capasity	0	-	Efficiency % of max capacity	0	-
Viscosity cP (10 s ⁻¹)	68 539	-	Viscosity <i>cP (10 s⁻¹)</i>	68 539	-	Viscosity <i>cP (10 s⁻¹)</i>	68 539	-
Water content vol %	0,6 %*	-	Water content vol%	0,6 %*	-	Water content vol%	0,6 %*	-

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Pouring the oil into the basin













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